

PSYCHOLOGY INFORMATION FOR STUDENTS

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1. STUDYING SHORT-TERM MEMORY AND THE WORKING MEMORY
SYSTEM
2. A QUESTIONNAIRE-BASED STUDY OF ATTITUDES AND
BEHAVIOUR TOWARDS THE POLICE

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STUDYING SHORT-TERM MEMORY AND THE WORKING MEMORY SYSTEM

The holding of information in memory for a limited period of time, like seconds, requires a short-term memory store. Atkinson and Shiffrin (1968) proposed that memory was divided into the short-term store and the long-term store in the two-process model ¹.

Subsequent work on the short-term store led to the Working Memory System (WMS)(Baddeley and Hitch 1974), which differed in a number of ways from the two-process model:

- i) WMS saw short-term memory as a number of sub-systems rather than as unitary (Baddeley 1996a);
- ii) WMS emphasised the functional role in tasks like learning, reasoning and comprehension (Baddeley 1996a);
- iii) Emphasis on combined processing and storage as seen by a task where participants read a series of unrelated sentences and then recall the final word of each sentence (Baddeley 2003).

Thus working memory is "limited capacity system that is capable of storing and manipulating information and that is assumed to be an integrated part of the human memory system" (Baddeley 1996a) ². "Working memory forms an interface between memory, attention and perception. As such, it is a complex system involving a range of interacting subcomponents" (Baddeley 1998 p237).

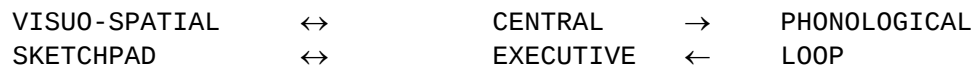
Baddeley and Hitch (1974) first came to the idea of sub-systems in the short-term memory through experiments typical of the kind. Participants had to remember a sequence of numbers while performing another task like comprehending a written passage. It was assumed that the longer the sequence of numbers, the less capacity would be left in the short-term store, and thus comprehension would decline. Comprehension tended to be unaffected by the number of digits to recall. Thus the idea that short-term memory must have a number of sub-systems.

Baddeley and Hitch (1974) proposed a central

¹ Hebb (1949) is credited as being the first to distinguish a short-term and long-term memory. Experimental support for short-term memory came from Brown (1958), and Peterson and Peterson (1959) (appendix).

² Baddeley (2000) noted different meanings to the term "working memory" in cognitive psychology. The use in the WMS means a "limited capacity system allowing the temporary storage and manipulation of information necessary for such complex tasks as comprehension, learning and reasoning" (p418). In animal learning studies, it means to hold information learnt about a maze, for example, over a day, and in cognitive modelling means a system with unlimited capacity.

executive (that controls attention given to different tasks) and two slave systems - the visuo-spatial sketchpad ³ (holding visual information) and the phonological or articulatory loop (holding speech-based information) (figure 1) ^{4 5}.



(After Baddeley 2003)

Figure 1 - Original WMS model.

Developments in brain scanning technology has helped in isolating the brain areas for parts of the WMS and provide physiological evidence for it (table 1). Baddeley (1996b) felt that physiological evidence was less fruitful because the "model is principally a functional model that would exist and be useful even if there proved to be no simple mapping on to underlying neuroanatomy" (p6).

WORKING MEMORY SYSTEM COMPONENT	MAIN BRAIN AREA ACTIVE
Phonological store	Left perisylvian region (eg: Brodmann area 40)
Articulatory rehearsal system	Broca's area
Visuo-spatial sketchpad	At least four areas in occipital, parietal and frontal lobes (eg: visual cortex)
Central executive	Frontal lobes including the dorsolateral prefrontal cortex

Table 1 - Examples of areas of brain and components of WMS.

The WMS has been studied using a number of methods:

i) Laboratory experiments - Participants are studied in controlled environments doing two tasks simultaneously (dual-task performance). Table 2 gives an example of the design of dual-task experiments, and table 3 lists the main advantages and disadvantages of this method.

³ Sometimes called the "visuo-spatial scratch pad".

⁴ Salamé and Baddeley (1982) added the primary acoustic store which receives auditory input directly from the central executive or indirectly from the phonological loop.

⁵ Each component was given a popular name - articulatory loop (inner voice), visuo-spatial sketchpad (inner eye), and primary acoustic store (inner ear) (Cohen et al 1986).

GROUP:	C 1	C 2	E 1	E 2	E 3	E 4
1ST TASK	visual	verbal	visual	visual	verbal	verbal
2ND TASK	none	none	visual	verbal	verbal	visual
INTERFERENCE	/	/	yes	no	yes	no

(E = experimental group; C = control group)

Table 2 - Example of experimental design for dual-task experiments.

ADVANTAGES	DISADVANTAGES
1. Control over variables and participants. 2. Not possible to study in detail in real-life. 3. Isolation of variables and establishing of cause and effect.	1. Participants required to do artificial tasks. 2. Participants may behave differently to everyday life - eg: try harder to please experimenter or try less because tasks boring. 3. Requires large amount of equipment; eg: computer screens.

Table 3 - Advantages and disadvantages of the dual-task laboratory experiment.

ii) Neuroimaging studies - Through the use of techniques like PET scans and functional magnetic resonance imaging, the brain activity can be measured during different tasks known to use sub-systems of the WMS (table 4).

ADVANTAGES	DISADVANTAGES
1. Allows researchers to see brain activity. 2. Gives physiological basis to the theoretical model. 3. Able to use with dual-task tests.	1. Expensive and time-consuming for each scan. 2. Individuals required to remain still for long periods of time. 3. Only establishes the physiological correlates for behaviours not cause and effect.

Table 4 - Advantages and disadvantages of neuroimaging techniques to study working memory.

iii) Brain-injured patients - Individuals with naturally-occurring damage to areas of the brain can be compared to healthy controls (table 5).

ADVANTAGES	DISADVANTAGES
1. Possible to see the effects of parts of the brain when "turned off" by accident or illness. 2. Able to use with dual-task tests. 3. Can be compared with healthy controls on tests.	1. These individuals are not typical of the general population because their brains have been changed. 2. Brain injury may cover a large area and is not isolated to specific parts. 3. Some individuals may not fully understand the nature of the experiment (eg: Alzheimer's sufferers).

Table 5 - Advantages and disadvantages of using brain-injured patients to study working memory.

PHONOLOGICAL LOOP

This is a temporary store for acoustic or speech-based information lasting 2-3 seconds unless rehearsed. Put simply, as many short words can be remembered as can be said in two seconds (Baddeley 1996a). This became known as the phonological store, and was distinguished from the articulatory rehearsal process - the two-component model of the phonological loop (Vallar and Papagno 2002).

The phonological loop is usually tested with immediate recall of numbers, letters or words. It was found that similar sounding letters like "V, B, G, T" are recalled less than dis-similar ones like "W, X, R, Y" ("phonological similarity effect"). The same is true for words rather than meanings. This suggests that information is stored as acoustic code (Baddeley 2003) ⁶.

The phonological loop has been studied using articulatory suppression. This requires the participant to continuously repeat a word like "the" or nonsense (eg: "blah") while attempting to remember information. Articulatory suppression stops rehearsal, and the information is forgotten. It also stops the transfer of visually presented information into an auditory code (Baddeley 2000).

But articulatory suppression does not produce complete forgetting. For example, memory span may drop from seven to five digits auditory presented. This observation was a problem for the original WMS model (Baddeley 2000).

⁶ Meaning is crucial in long-term memory not sound. So words that have similar meanings are confused in long-term recall tests (Baddeley 1966).

Recall of unrelated words using the phonological loop is usually five to six, but it is three times more if the words are in a meaningful sentence. This shows that additional information from the long-term memory is used, and this was another problem for the original WMS. So the idea emerged that the central executive must have a storage capacity (ie: "episodic buffer").

Baddeley et al (1988) proposed that the phonological loop was involved in language acquisition, and for adults learning a second language. Support for this idea comes from adults with brain damage to the phonological loop but not to general long-term memory. They are unable to acquire the vocabulary of a new language (Baddeley et al 1998). For children, the ability to acquire the vocabulary of the first language has been predicted from their ability to repeat back unfamiliar pseudo-words (an ability that uses the phonological loop)(Gathercole and Adams 1994).

VISUO-SPATIAL SKETCHPAD

This is limited to 3-4 visual objects (Baddeley 2000).

Baddeley (2003) proposed that the function of the visuo-spatial sketchpad might be "in acquiring semantic knowledge about the appearance of objects and how to use them, and for understanding complex systems such as machinery, as well as for spatial orientation and geographical knowledge" (p834).

A typical experiment for testing this part of the WMS involves asking participants to memorise sentences about spatial information. Participants are presented with a matrix and told to place each sentence in a different cell in their minds (eg: "in the starting square put a 1", "in the next square up put a 3"). Then they perform another visuo-spatial task equivalent to driving a car on a winding road. Performance on the recall of the sentences declines (Baddeley et al 1975) because both tasks are using the same sub-system.

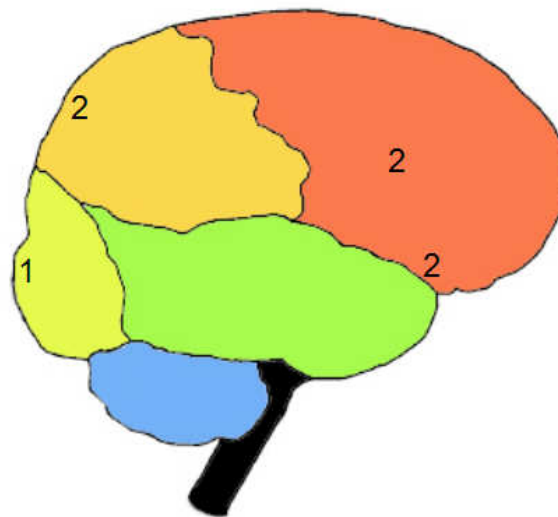
However, other research has shown differences between visual and spatial memory. Spatial memory span is tested with the Corsi block task where nine numbered blocks are laid out in an array and participants must immediately recall the position of the blocks. Accuracy of recall in this task is disrupted more by another spatial task than by a visual task (35% incorrect vs 20%; Della Sala et al 1999). Visual (non-spatial) memory is tested by presenting a matrix with half the cells filled, and participants must immediately recall which cells were filled. Performance is reduced more by another visual

task than a spatial one (35% incorrect vs 16%; Della Sala et al 1999).

Logie (1995) has sub-divided the visuo-spatial sketchpad into a visual cache, and an "inner scribe". Logie and Pearson (1997) preferred to see the visuo-spatial sketchpad as "a temporary store or on-line 'cache' for visual and/or spatial information" rather than as "a medium within which to generate and manipulate visual mental images".

The visual cache stores information about visual form and colour, and is linked to the visual perception system. The inner scribe stores information about movement sequences, and is linked to the planning and execution of movement (Logie and Pearson 1997) (figure 2).

Smyth and Pendleton (1990) suggested motor and kinaesthetic sub-components to the visuo-spatial sketchpad.



1 = Visual cache

2 = Inner scribe

(Based on Baddeley 2003; own drawing on diagram in public domain at http://commons.wikimedia.org/wiki/Main_Page)

(Visual cache also in area of left hemisphere)

Figure 2 - Tentative mapping of visual cache and inner scribe onto the right hemisphere.

CENTRAL EXECUTIVE

This part of the WMS is responsible for allocating attention to the slave systems. It is the "most important but least understood component of working memory" (Baddeley 2003).

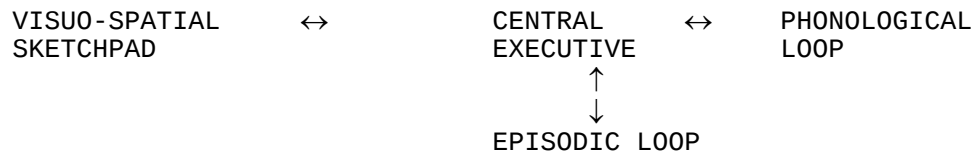
"In the original model, it was simply treated as a pool of general processing capacity, to which all the complex issues that did not seem to be directly or specifically related to the two sub-systems were assigned" (Baddeley 2003 p835).

It was noticed that individuals with Alzheimer's disease performed badly on all types of working memory tasks, and this was taken to be a deficit in the central executive. Baddeley et al (1986) compared individuals with Alzheimer's, healthy elderly controls, and healthy young controls on tasks that used both the phonological loop (eg: digit recall task) and the visuo-spatial sketchpad (eg: keep a light pen in contact with a moving spot of light on a VDU). As the tasks became more difficult (ie: using more attention), performance on both tasks declined slightly for the healthy control groups and substantially for the Alzheimer's group. The latter group were less able to divide attention effectively between the tasks.

Baddeley (1996b) admitted that "our initial specification of the central executive was so vague as to serve as little more than a ragbag into which could be stuffed all the complex strategy selection, planning, and retrieval checking that goes on when subjects perform even the apparently simple digit span task" (p6).

Baddeley (1986) suggested that the central executive had two parts - one part channels attention to well-learned habitual patterns of behaviour, and the other (supervisory activating system; SAS) that over-rides the first part when attention is required for a particular behaviour.

A number of problems with the central executive, like the lack of a system where chunking of information could occur or a mechanism for the phonological and visuo-spatial sub-systems to interact directly, led to a new component - the episodic buffer (Baddeley 2000). It is controlled by the central executive in terms of attention, and binds together information using different codes (ie: visual and acoustic). It can be regarded as a storage system for the central executive (Baddeley 2003) (figure 3). Table 6 summarises the problems with the WMS which led to the inclusion of the episodic buffer.



(After Baddeley 2003)

Figure 3 - Updated WMS model with fourth sub-system.

- Articulatory suppression does not lead to complete forgetting in the phonological loop.
- Chunking of meaningful information suggested that the central executive has a storage capacity.
- The need for interaction between the phonological loop and the visuo-spatial sketchpad.
- The need for a place to bind together information from different sources.

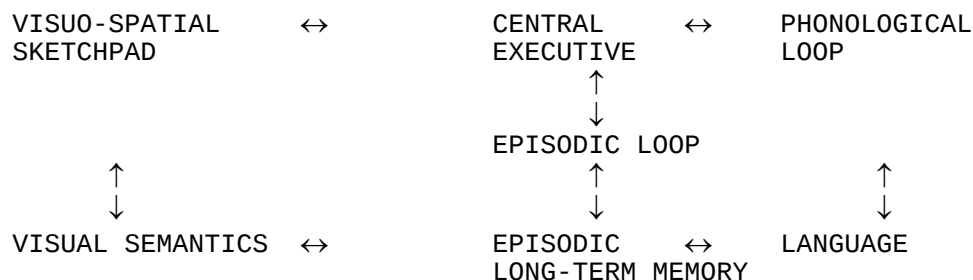
Table 6 - Problems with WMS which led to episodic buffer.

Physiological support for the episodic buffer comes from a functional magnetic resonance imaging study by Prabhakaran et al (2000). Participants were presented with verbal and spatial information which made sense when integrated or not. There was a greater right frontal lobe activity for integrated information, but not for unintegrated.

CONCLUSION

Baddeley (2003) concluded that "working memory continues to provide a highly productive general theory: human thought processes are underpinned by an integrated system for temporarily storing and manipulating information" (p837).

The updated version of WMS has also been linked more clearly to long-term memory (figure 4)(Baddeley 2000).



(After Baddeley 2000)

Figure 4 - Updated WMS model and relationship to long-term memory.

Figure 5 includes the proposed sub-divisions of the components of the WMS.

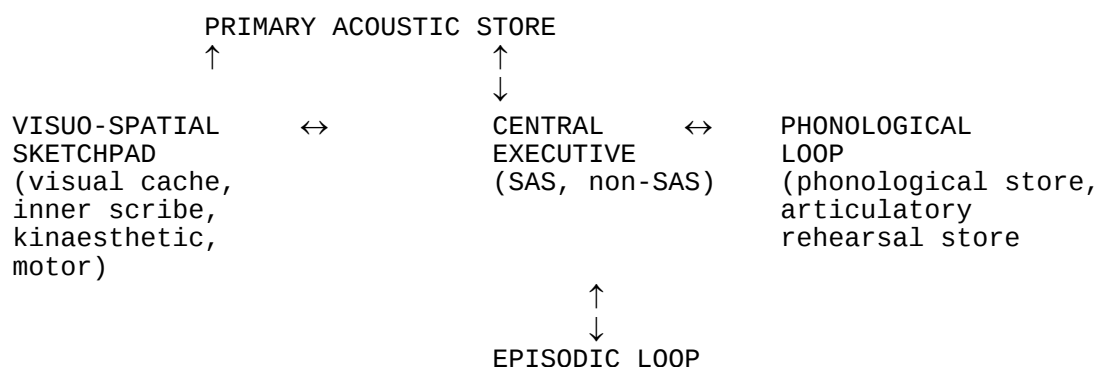


Figure 5 - WMS model including proposed sub-components.

APPENDIX

Brown (1958)

In experiment 1, ten participants were asked to read out 1-4 pairs of consonants and five pairs of numbers, and then immediately recall the consonants. The reading out of the numbers prevented rehearsal. The control group always read out the pairs of consonants and sat in silence for a short period before the recall (the equivalent time to reading out the numbers - approximately five seconds). Recall was better for the pair of consonants at the beginning of the list than at the end.

Experiment 2 was very similar to experiment 1, but some of the fifteen participants read out three more pairs of consonants, which did not have to be recalled, instead of three pairs of numbers to prevent rehearsal. The similarity of material produced interference and reduced recall of the consonants.

In experiment 3, twelve students followed the procedure of experiment 1, but there was a short gap (0.78, 2.34 or 4.68 seconds) between reading out the consonants to be recalled and those to prevent rehearsal. The longer the gap, the greater the opportunity for rehearsal, and thus improved recall.

Figure 6 summarises the design of the three experiments.

EXPERIMENT 1

Experimental group

Read out material → Read out material → Recall test
to recall (M) preventing rehearsal (X)

Control group

M → Silence → Recall test

EXPERIMENT 2

M → Similar X → Recall test

M → Dis-similar X → Recall test

EXPERIMENT 3

M → Gap → X → Recall test

Figure 6 - Design of three experiments by Brown (1958).

This study showed that interference in short-term memory prevents rehearsal and thus recall of information over very short periods (eg: five seconds).

Peterson and Peterson (1959)

Experiment 1 used twenty-four students from introductory psychology courses at Indiana University who had to participate as a course requirement. Participants were given three letters to remember for a short period, but during that time they had to count backwards in threes. For example, the experimenter might say "ABC 309", and the participant had to remember ABC and count backwards from 309. Time intervals were used of 3, 6, 9, 12, 15 and 18 seconds.

Accuracy of recall declined with increasing time intervals. The difference between 3, 6, 9, 12 and 18 seconds was significant at the 0.05 level, and the difference in recall between three and eighteen seconds was significant at the 0.01 level.

In experiment 2 forty-eight students followed a similar procedure to experiment 1, but half the participants were instructed to repeat the stimulus either out loud or silently before counting backwards. This allowed rehearsal of the information to be remembered, and significantly more was recalled than where rehearsal was not allowed. Table 7 shows the results for the longest interval (eighteen seconds).

	REHEARSAL	NO REHEARSAL
Rehearsal out loud	34	14
Rehearsal silently	30	15

(After Peterson and Peterson 1959)

Table 7 - Percentage of correct recall of stimulus.

The studies by Brown and the Petersons are important for a number of reasons:

- They established a technique for testing short-term memory, known today as the "Brown-Peterson technique".
- They showed that recall declines with time in short-term memory where rehearsal is prevented. This is the idea of decay in short-term memory.
- They showed that rehearsal of information to be remembered improves short-term recall.

Table 8 compares the experiments by Brown and the Petersons.

	PETERSON AND PETERSON (1959)	BROWN (1958)
University students	USA	British
Number used	72 in 2 experiments	37 in 3 experiments
Prevented rehearsal	Counting backwards	Reading out loud
Interference material	Always counting	Numbers, consonants
Time intervals	3 - 18 seconds	maximum 5 seconds
Variations	Experiment 2: silence vs loud rehearsal	Experiment 3: time gaps between M and X

Table 8 - Comparison of the studies by Brown and the Petersons.

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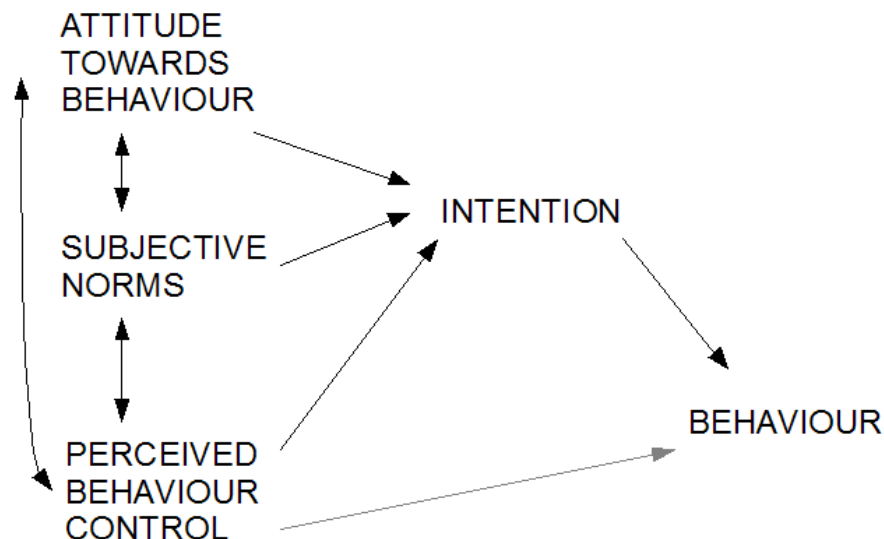
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VIKI ET AL (2006)

What about the relationship between the attitudes towards the police and the behaviour of initiating contact with them (eg: reporting a crime)?

Viki et al (2006) attempted to explain attitudes and behaviour towards the police using the theory of planned behaviour (TPB)(Ajzen 1985). This model includes a number of factors between the attitude and the behaviour (or intention to perform the behaviour). These factors are the attitude towards the behaviour, subjective norms about the behaviour (what individual believes others want), and perceived behavioural control (ability to do the behaviour). The key variable is intention to do the behaviour which will predict the actual behaviour, and attitudes play a part in the intention (figure 3).



(After Potter 1996)

Figure 3 - Theory of planned behaviour.

Method

One hundred and twenty students ⁽¹⁾ (49 male and 71 female) were recruited from universities in south-east England, of which 56 were self-defined as Black and 64 as White ⁽²⁾. Participants were left to fill out the questionnaires on their own if they agreed to participate in the research. The questionnaires were thus self-reported or self-administered (table 1).

ADVANTAGES	DISADVANTAGES
1. Gets opinion of respondent. 2. Does not involve an outsider trying to make an assessment of the individual. 3. Convenient and easy to use. 4. Does not need interviewer to be present.	1. Depends on honesty of respondent. 2. No way of verifying information given. 3. Respondent may misunderstand questions. 4. Interviewer-administered questionnaires allows control of interview.

Table 1 - Advantages and disadvantages of self-reported questionnaires.

The behaviour being studied was the intention to co-operate with the police as shown with five hypothetical scenarios ⁽³⁾ (eg: "If you saw someone being beaten up outside a pub") ⁽⁴⁾. Participants indicated how likely, on a seven-point Likert scale ⁽⁵⁾ (Likert 1932)(table 2) from "very unlikely" to "very likely", they would be to call the police, provide witness statements, and give evidence in court. This questionnaire was filled in last so as not to influence answers the other questionnaires (ie: to reduce demand characteristics or social desirability bias).

STRENGTHS	WEAKNESSES
1. Measures the cognitive component of attitudes. 2. Asks direct questions. 3. Collects clear numerical data. 4. Simple to use. 5. Easy to construct.	1. Depends on honesty of respondents. 2. Vulnerable to social desirability bias (ie: giving socially acceptable answer). 3. Collects only ordinal data because scores are relative to group. 4. Middle score (eg: "unsure") on each item is ambiguous. 5. A total score of halfway can mean "unsure" or alternating between extremes.

Table 2 - Strengths and weakness of the Likert scale ⁽⁶⁾⁽⁷⁾.

The other factors within the TPB was measured:

- Attitude towards police - A seven-point Semantic

Differential Scale (Osgood et al 1957) (table 3) was used (figure 4).

"Providing assistance to the police is.."

GOOD	— — — — —	BAD
HARMFUL	— — — — —	BENEFICIAL
WORTHLESS	— — — — —	VALUABLE
USELESS	— — — — —	HELPFUL

Figure 4 - Semantic Differential Scale to measure attitude towards police (8).

STRENGTHS	WEAKNESSES
1. Measures the affective component of attitudes.	1. Prone to "position response bias" (tendency to tick the middle position).
2. Gains an instant response which reduces the risk of social desirability answers.	2. Time consuming to design.
3. Respondents not influenced by words or numbers.	3. It is a quasi-direct method and so has some issues related to validity of items (ie: do they measure what they claim to measure).
4. Simple to use.	4. How to interpret the middle position - unsure or automatic response?
5. Possibly overcomes problem of honesty of respondent.	5. How many points to have?

Table 3 - Strengths and weaknesses of the Semantic Differential Scale.

- Perceived subjective norms of co-operating with the police - The level of agreement with five statements (eg: "Most people who are important to me would provide assistance to the police") measured perceived social norms around helping the police (9);
- Perceived behavioural control - Four items measured how much the individual felt in control of their behaviour (eg: "It is mostly up to me whether I assist the police") (10).

The reliability of the questionnaires was established with Cronbach's alpha (Cronbach 1951). This calculates all the possible split-half correlations between items in the questionnaire (eg: odd vs even number questions). The higher the correlation, the greater the internal reliability. Table 4 lists the Cronbach's alpha scores.

Participants' responses were combined to provide average scores for each participant on each measure.

The quantity ⁽¹¹⁾ and quality of contact ⁽¹²⁾ with the police was also measured. There was no difference in the quantity of contact between the Black and White participants, but the Black participants did report less positive quality of contact.

MEASURE	CRONBACH'S ALPHA
• Intention to call police	.87
• Intention to provide witness statement to the police if necessary	.94
• Intention to give evidence in court if necessary	.95
• Attitudes towards police	.90
• Subjective norms	.76
• Perceived behavioural control	.67
• Quality of contact with police	.67

Table 4 - Cronbach's alpha scores for internal reliability of questionnaires.

Findings

Analysis of the questionnaires found no significant differences for perceived behavioural control, or willingness to report an incident to the police, but significant differences between the Black and White participants on the other variables (table 5).

VARIABLE	BLACK	WHITE	KEY
Provide witness statement	4.77	5.61	Higher score = more willing
Give evidence in court	4.52	5.34	Higher score = more willing
Attitude towards police	4.33	5.41	Higher score = more positive
Subjective norms	4.06	5.09	Higher score = greater social norms for co-operating with police

(After Viki et al 2006)

Table 5 - Means for variables with significant differences between Black and White participants.

Further analysis found that quantity of contact with

the police significantly negatively correlated with attitudes towards police ($r = -0.33$), while quality of contact significantly positively correlated ($r = 0.55$). Thus the better the contact with the police, the more positive the attitude towards them, and the more likely to co-operate with them.

Overall, attitudes towards police significantly predicted willingness to co-operate with the police in any form. Subjective norms had some effect, and perceived behavioural control no role.

Putting the results together, the intention to provide a witness statement and give evidence in court is influenced by attitude towards police and subjective norms concerning co-operation with police. These two factors were influenced by quality of contact with the police, which, in turn, was influenced by race (figure 5). So Black individuals were more likely to have negative contact with the police, which produced a negative attitude towards the police, and social norms against co-operation, and thus the unwillingness to help the police.

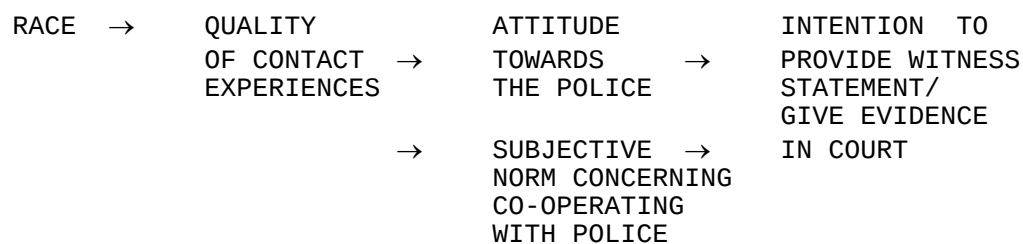


Figure 5 - Relationship between race and co-operation with police.

In terms of the TPB, it was found to be partly useful in predicting behaviour (ie: attitudes, subjective norms), but not perceived behavioural control, while quality of contact was an important addition.

General Evaluation of Methodology

1. Hayes (1994) argued that direct and quasi-direct measures of attitudes make three basic assumptions:

- That attitudes can be expressed by verbal statements;
- That the same statements have the same meanings for all individuals;
- That the expressed statements can be measured and quantified.

2. Viki et al (2006) was questionnaire-based research which means that cause and effect could not be established. This requires experimental and/or longitudinal research. However, structured questionnaire-based research does have strengths (table 6).

STRENGTHS	WEAKNESSES
1. Access to attitudes of respondents. 2. Easier to get larger sample than many other methods. 3. Structured questions provide numerical data. 4. Structured questions allow comparison of answers between individuals and groups. 5. Gain information that cannot be observed.	1. Depends on honesty and accuracy of answers from respondents. 2. Limited by nature of questions. 3. Structured questions tend not to allow for answers that do not fit pre-determined categories or give opportunity for explanation of answers. 4. Risk of social desirability bias. 5. Interviewer-interviewee interaction variables.

Table 6 - Main strengths and weaknesses of structured questionnaire-based research.

3. Dean and Whyte (1958) suggested certain things to check to establish if the respondent is telling the truth:

- Ulterior motive;
- Desire to please;
- Bars to spontaneity;
- Idiosyncratic features (unique to the individual);
- Poor memory;
- Selective perception of situation.

4. Attitudes are not individualised, objective beliefs
Potter (1996) was critical of the assumption that attitudes are individual possessions because many people share similar views and beliefs. Social representation theory argued that individual attitudes develop from shared social representations in the media and in society rather than directly from the stimulus object (Moscovici 1984).

Thus an individual's attitude towards the police is not directly related to the police, but to the social representations of the police (eg: positive or negative) (figure 6). How the media represents condoms is key here.

Traditional view of attitudes

ATTITUDE → POLICE

Social Representations Theory

ATTITUDE → SOCIAL REPRESENTATIONS (eg: media images) → POLICE

Figure 6 - Attitudes and social representations.

Moving away from individualised attitudes even further, in discursive psychology (Potter 1996), the expression of an attitude is seen as an action. An individual is trying to achieve something in the social world by expressing that opinion rather than an attitude being a statement of fact.

For example, after watching a film, person A meets friend X who says that the film was bad, and person A agrees. Then person A meets friend Y who praises the film, and person A again agrees. Within discursive psychology, person A is not being inconsistent, but is agreeing in order to bond with the friends. The expression of the agreement is in order to achieve an action.

EVALUATIVE FOOTNOTES

1. Though the ages ranged from 19-50 years, the mean age was 24 years old. The use of students as participants is convenient, but they are not representative of the general population in a number of ways including age, attitudes, and intelligence. Using an unrepresentative sample does limit the generalisability of the findings to a wider population. Students may have less contact with the police than non-students (Viki et al 2006). Furthermore, the students were recruited from a limited number of universities. The researchers themselves were based at the University of Kent in Canterbury.

Volunteers were approached around the campuses. Records were not kept of participant refusal rates, and so the students used may not even be representative of students generally.

2. The researchers did not offer the option of "bi-racial" (p291). The racial mix was not representative of the student population at the universities as Black participants were over-sampled (Viki et al 2006).

3. Hypothetical scenarios adapted from Smith (1983).

4. The other four scenarios were "If you saw a stranger acting suspiciously outside a neighbour's house", "If you heard neighbours having a row and thought someone might be injured", "If you saw someone trying to force their way into a car you knew did not belong to them", and "If you saw people climbing over a back wall of a factory of offices at night" (p291).

Though the hypothetical scenarios were based on real-life events, participants may rate their behaviour as they would like to behave rather than actually how they would behave. A better measure could be to use real-life events, and interview individuals who did and did not contact the police etc.

5. Likert (1932) offered five response alternatives - strongly approve, approve, undecided, disapprove, and strongly disapprove. Subsequent research has varied the number of response alternatives. Clason and Dormody (1994), analysing research published in the "Journal of Agricultural Education", found seven alternatives was the most popular, and that many studies removed the "undecided" option and offered four alternatives. One study had 99 response alternatives.

6. Secord and Backman (1964) believed that attitudes had three components - cognitive (beliefs about attitude object), affective (feelings about attitude object), and behavioural/conative (behaviour towards attitude object).

7. The problem of interpreting the middle score can also be seen with different hypothetical groups. There are five response alternatives, and in group A 20% of respondents choose each one. In group B, 50% of respondents choose option 1 and 50% choose option 5. Both groups have a mean of 3.00 or the "undecided" response alternative, "but only the most naive analyst would claim these populations are similar" (Clason and Dormody 1994 p32).

8. The "good-bad" item was reverse-scored.

9. The other four items were "Most people who are important to me think I should assist the police", "It is expected of me to assist the police", "The people in my life whose opinions I value would approve of my assisting the police", and "The people in my life whose opinions I value would not provide assistance to the police" (p292). The last item was reverse-scored.

10. The other three items were "For me to assist the police is impossible", "If I wanted to assist the police I could", and "How much control do you believe you have over assisting the police" (p292).

11. This was measured by two items: "In general, how much contact do you have with the police in your daily life?" ("none at all" to "very often"; seven options), and "If you have contact with the police, how often does it take place" ("1 to 6 times a year" to "daily"; four options) (p292).

12. Three Semantic Differential Scales were used: involuntary-voluntary, very much pleasant-not at all pleasant, and competitive-co-operative. A fourth scale, superficial-intimate, was removed as less reliable.

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